Deployment of access services based on HbbTV standard technology

Project HBB4ALL

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Abstract— **This paper presents an overview of the European project HBB4ALL. It explains: how access services can be provided by means of HbbTV applications, why connected TV features become useful for this purpose, and how to get fully satisfying access services for the citizens.**

Keywords—Connected TV, HbbTV, access services, accessibility, HBB4ALL, human-device interface, hybrid TV

I. INTRODUCTION

During the last years a new technological paradigm has arisen. It is named "Connected TV" and is characterised by hybrid terminals capable to receive and to play multimedia content coming from both a broadcast network (e.g., digital terrestrial television or satellite) and Internet. Actually, this new paradigm reflects a more general convergence frame that integrates two traditionally different technological worlds: on the one hand, broadcasting and audiovisual content, and on the other hand, computers, IT devices and Internet.

HbbTV (Hybrid Broadcast Broadband TV) [1] is an open, standard specification for Connected TV, supported by a group of stakeholders and published by the ETSI (European Telecommunications Standards Institute). HbbTV allows both broadcasters and TV-set manufacturers to exploit multimedia contents via Internet. For this reason, HbbTV is a valid specification for horizontal markets, such as digital terrestrial television and free-to-air satellite broadcasting.

Recently HbbTV 2.0 release has been published. It integrates new features, such as second screen (another innovative media consumption paradigm) and HTML5 support. This paper explains how HbbTV can be used to provide access services, such as: subtitling, audio description, clean audio, and signing (section 3). Access services are key to extend multimedia content to as many citizens as possible, including people with disabilities, as a way to guarantee fundamental rights, such as access to information.

The European project HBB4ALL [2] (described in section 2) is currently deploying four inter-related pilots to validate the feasibility and sustainability of such service implementations. A key aspect in HBB4ALL is to collect user feedback coming from lab tests and large-scale pilots to check the suitability of these services. The methodology created in the project is described in this paper (section 4).

II. HBB4ALL PILOT DESCRIPTION

HBB4ALL (Hybrid Broadcast Broadband For All) is a European project co-funded by the European Commission inside the Competitiveness and Innovation Framework Programme (CIP). The HBB4ALL project typology is named "pilot", since it takes advantage of new but already validated technologies (HbbTV in this case) to deploy near-market services in real exploitation conditions. Moreover, HBB4ALL aims at optimising services and a fully satisfying user experience.

The presence in the HBB4ALL consortium of relevant European broadcasters established across Europe ensures a potential audience of millions of citizens at the pilot sites. This fact will allow checking the HbbTV-based access services in large-scale conditions.

Actually, HBB4ALL consists of four different but inter-related pilots:

- Pilot A. Multi-platform subtitle services
- Pilot B. Alternative audio production and distribution
- Pilot C. Automatic user interface adaptation and accessible Connected TV applications
- Pilot D. Sign language interpretation

The planning of these pilots consists of the same four phases, whose core is the "operational phase", starting in summer 2015. Not only is HbbTV considered in the project, but also other IP-transmission web-based technologies.

III. INTEGRATING ACCESS SERVICES IN HYBRID DEVICES

Although HbbTV is not a technology specially conceived to provide access services, this paper explains how it can be used for this purpose. Firstly, two different concerns arise: how to make new broadband contents (e.g., a catch-up application) accessible and how to take advantage of HbbTV features to provide new access services and to improve accessibility in

audiovisual contents (e.g. providing signing via broadband connection for broadcast contents).

From a wide perspective, Connected TV advantages are due to three inherent characteristics. Firstly, the Internet connection enables a great potential for the flexible delivery of all kind of contents. Secondly, the Connected TV paradigm assumes a large bandwidth in the available Internet connection (in fact, it is named "broadband"). In this way, contents that require a high bitrate (e.g., high quality video) can be delivered. Finally, the Internet connection provides an always-on return channel, enabling interactivity and personalization capabilities.

These characteristics imply a high potential for the deployment of innovative Internet services and contents to be watched on consumer electronic devices. The project HBB4ALL proposes to extend this potential to accessibility.

The main TV-set manufacturers have developed their proprietary specifications to play Connected TV contents on their respective devices. This service is sometimes named "Smart TV". These specifications do not require interoperability since each manufacturer exploits its own broadband portal.

HbbTV, as a standard technology, brings additional advantages since it is an open specification that enables interoperability between contents, broadband portals and consumer electronics devices (such as hybrid TV screens). In this way, not only can manufacturers exploit their portals, but also broadcasters and content providers.

From its first release, HbbTV is based on previous existing technologies in order to get a faster deployment. One of these key technologies is CE-HTML[3], i.e. an HTML specification for consumer electronics devices, which takes into account the limited processing capabilities of this kind of devices. HbbTV applications are basically CE-HTML pages, which are interpreted by a browser embedded in the TV screen. HbbTV provides a standard way to depict web and multimedia contents on TV screens. Since it is based on a set of known standards and norms, an HbbTV application developer can be sure about the application appearance and behaviour on any HbbTV-compliant hybrid terminal.

These features can be observed in the particular case of signing. HBB4ALL specifically aims to implement an HbbTV-based signing service. Signing has been traditionally provided in open implementations, i.e. all the viewers can watch the sign language interpreter, what is seen as distracting and screen contaminating by a part of the audience who does not require the service [4]. For this reason, a closed (elective) signing implementation would be a great advance [4]. This is exactly the purpose of HBB4ALL, which is going to deploy a signing service via broadband connection. In this way, the sign language interpreter is shown only when requested by the user. The broadband capabilities allow the transmission of good quality video.

Nevertheless, an additional concern has arisen in the project. Consumer electronics manufacturers seldom integrate standardized optional (i.e. non-mandatory) features, which would enable further service capabilities. For example, in the case of signing a double-decoder functionality (optional in HbbTV) would allow to deploy truly hybrid signing services, where programme video would be delivered via the broadcast channel and signing video would be delivered via Internet (broadband network). The double-decoder hybrid terminal would join both video signals in a flexible and customisable manner.

IV. TEST METHODOLOGY

The project has been designed following a user-centric approach. This was adopted since the user, his satisfaction and expectations, are the final objective of improving media accessibility to content. End users, and the many agents involved in the value chain are also part of the project, defining quality of experience and service. Following the Persons with Disabilities declaration “nothing for us without us”, end users are central to the project.

In order to fulfil user needs, a first task was to define the different stakeholders in the project, and their role. Since access service quality benchmarking is an important issue in the project it was required to understand needs and expectations from each.

The project will test access services in manifold pilot implementations (from the definition to the operational phase). It will also gather implicit and explicit user feedback to assess the acceptance and the achievable quality of service in the various delivery scenarios.

The evaluation of the large-scale pilot implementations of the HBB4ALL broadcast partners in the six months pilot phase at the different sites will bring extensive results as to user needs and potential improvements of the novel services. In addition the complementary user testing on the quality of accessibility services performed by the partners in lab tests in different European countries will bring extensive results which will enrich the large-scale pilot service validation results and vice versa.

V. CONCLUSIONS

HBB4ALL is currently an ongoing project. The operational phase of the four pilots is starting in a few months and it will provide useful conclusions about the service performance. In any case, the initial hypothesis of the project is already confirmed: new audiovisual technologies can be seen as new ways to provide accessibility in consumer electronics devices, which are key elements for the deployment of innovative services.

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